lowest achievable costs of providing the UNEs, rather than the incumbents' (presumably higher) "actual" costs. Rather than a reason to condemn TELRIC, this confirms its appropriateness.

59. *TELRIC Is Fully Compensatory.* The incumbents' major criticism of TELRIC is that it assumes a level of efficiency greater than an incumbent may be able to achieve in practice. In particular, they state that TELRIC continuously requires that costs be based on efficient technology and network design, but that the network investments made by incumbents often will be rendered obsolete by technological advances. Because this investment is sunk, the incumbents argue, they are limited in their ability to optimize their network. *See, e.g*, Kahn-Tardiff (Verizon) Decl. ¶¶ 17-20; NERA (BellSouth) Decl. ¶ 19; Shelanski (Verizon) Decl. ¶¶ 7-10. Thus, they claim that incumbent carriers will never be able to achieve the level of efficiency that a new entrant could and TELRIC systematically prevents them from recovering efficiently incurred costs.

60. The incumbents' complaint is not with TELRIC, but the dynamics of fully competitive or contestable markets. In competitive/contestable markets, a company can charge prices for services that cover only the costs of providing those services in the most efficient manner, even if the company actually paid more for the equipment it uses to provide that service. Competitive forces cannot make any allowance for historical costs because no current rival will abstain from competing via a final-product price that covers only the forward-looking costs of its investment, whether or not they exceed the historical costs. And since competitive market prices are those that are required for economic efficiency, the Commission should require UNE prices be independent of embedded cost and to be based instead on the costs of efficient operation.

61. The incumbents are likewise wrong in suggesting that "efficiency" is judged by whether an investment decision was efficient when made by the incumbent in the past, given the

constraints it faced at the time. BellSouth (NERA) Decl. ¶ 65. First, as explained above, because of the existence of already sunk assets, incumbent carriers will make investment decisions that are perfectly reasonable in the short run but that do not reflect the choices that would be made in the long run and that would result in optimal efficiency. Second, competitive markets do not care if a decision in the past was appropriate at that time. It may make perfect sense for a firm to deploy a certain type of technology, but if subsequent advances render that technology obsolete, a firm facing effective competition will not be able to set prices based on the full original costs of that investment.

62. Notably, incumbent economists concede that in fully competitive/contestable markets prices are driven down toward long run costs and that, in the long run, "all inputs are variable." Shelanski (Verizon) Decl. ¶ 35; NERA (BellSouth) Decl. ¶ 55 ("The real point of the long run is that it represents the length of time over which a firm can adjust production to move as close as possible to its most efficient level."); Weisman (Qwest) Decl. ¶ 22 ("A short run average cost methodology is inappropriate on multiple grounds.").

63. It is no answer to observe, as Verizon witness Dr. Shelanski does, that "in the real world in most cases" a firm will vary only a few of its inputs because "technology" is changing over time and it is difficult to estimate such changes. Shelanski (Verizon) Decl. ¶ 35. In competitive and contestable markets, the commercial availability of more productive technologies and practices sets a cap on the rates that incumbents can charge – whether or not they adopt the innovations themselves. Thus it is irrelevant that an incumbent firm may in the short term plan to make only a small number of changes that could be made over the long run to increase efficiency. *Id.* ¶ 36. In fully competitive or contestable markets, the value of those assets is capped at the costs of the most efficient provider, regardless of what changes the

individual firm may take. *Accord*, NERA (BellSouth) Decl. ¶ 74 ("If competitors can deploy new services or the same services at lower costs, particularly if the incumbent fails to do so, then there will be greater pressure [for the incumbent] to accelerate deployment of new technologies into the network.").

64. To the extent Dr. Shelanski is arguing that calculating "long run" costs somehow requires "speculat[ion]" about future technology and conditions (Shelanski (Verizon) Decl. ¶ 35), he simply misunderstand TELRIC. The TELRIC standard assumes only technology that is commercially available, and which can be demonstrated to provide current services at the quality level demanded by consumers. Likewise, in determining the size and configuration of the network, TELRIC does not require speculation about future demand, but simply asks how existing demand can be served most efficiently.

65. Nor is there any truth to the claim that such competitive-market pricing must generally be noncompensatory because, if production technology or input prices improve in the future, costs will go unrecovered. Aron-Rogerson (SBC) Decl. at 20; Kahn-Tardiff (Verizon) Decl. ¶¶ 17-20; NERA (BellSouth) Decl. ¶ 19; Shelanski (Verizon) Decl. ¶ 36. Forward-looking investment decisions are based on the firm's best expectations of future trends in prices, demand, technological innovation, and equipment values. Thus, if a competitive market expects these prices and values to decline, the firm will reflect this expectation in its offer prices for current equipment and its depreciation charges against such equipment. The Commission's TELRIC rules likewise require that depreciation and capital costs reflect these considerations. Hence, both competitive markets and TELRIC pricing provide for full *ex ante expected* compensation of investments.

66. Of course it is always possible that previous expectations will turn out to be incorrect and for a firm to find, *ex post*, that it has incurred uncompensated costs. But this is a risk that any firm in a competitive market must face, and a risk that the 1996 Act requires incumbents to face. Investment decisions must be made before all uncertainties can be resolved, and indeed in the real world they can never disappear. Neither competitive markets nor TELRIC can immunize an incumbent against unforeseen losses.

67. Notably, there is nothing unique about the "dilemma" asserted by the incumbents. The risk that sunk investment will be reduced in value (or even rendered worthless) by subsequent advances in technology, whether foreseen or not, is present in many industries. Yet such investments are routinely made because the *ex ante* compensation of investment promised to investors (return on capital and depreciation) is sufficient to compensate for this risk that later actual or potential entry will devalue the sunk assets.

68. Again, in competitive and/or contestable markets, irreversible decisions to commit to sunk assets are often unavoidable. These decisions entail a variety of types of risks, including the risk that tomorrow it may become clear that the firm would chose a type or configuration of assets that is not what it would choose today or would have chosen with the benefit of hindsight. The risk involved, however, is part of the cost of capital, however (arbitrarily) divided between return on, and return of, capital components of the cost of capital. So, for example, if a pole physically lasts forever so that there is no depreciation, but it might be made obsolete because it was placed in the wrong location, the risk of that could be put into the overall rate-of-return (and presumably investors have already done that to some extent in their extant requirements). In other words, the total percentage return of, plus return on, investment is

what matters to investors, not the division between the two. Sometimes that division is useful as a guidepost, but it never is controlling as far as investors are concerned.

69. Despite their anti-TELRIC rhetoric, the incumbent economists have acknowledged these very points. In a filing made in the *Triennial Review* proceeding, Dr. Kahn and Dr. Tardiff testified that "in its reply brief to the Supreme Court, the FCC described how, in principle, TELRIC can be sufficiently flexible to accommodate investment risks in a way that is approximately correct economically." Reply Declaration of Alfred Kahn and Timothy Tardiff, CC Docket Nos. 01-338 *et al.*, ¶ 40 n.52 (July 17, 2002) (citing Reply Brief for Petitioner FCC in *Verizon Communications Inc. v. FCC*) (hereinafter "Gov't *Verizon* Reply Br."). These incumbent economists also made the same concession in the original *Local Competition* proceeding. Gov't *Verizon* Reply Br. at 10-11 ("Indeed, in the FCC rulemaking that produced TELRIC, the incumbents acknowledged that an accurate calculation of economic depreciation and the costs of capital would obviate the problem that they allege here.") (citing statements).

70. The government's description of TELRIC before the Supreme Court emphasized the same points I am making here. The government observed that it had prescribed no particular depreciation lives or cost of capital and that state commissions remained free to "to accommodate[] reasonable economic assumptions about future technological advances and the effects of those advances will have on the value of current assets." Gov't *Verizon* Reply Br. at 11. Likewise, TELRIC requires a "risk-adjusted cost of capital" that takes into account "existing competitive risks" but "also risks associated with the regulatory regime to which a firm is subject." *Id.* at 12 & n.8. Thus, "[i]f depreciation lives and risk adjustment rates are calculated reasonably accurately, firms will be able to recover the costs of efficient investments [and] [t]hus the TELRIC approach, theoretically, is able to cope with the problems that worry its opponents."

Gregory Rosston and Roger Noll, *The Economics of the Supreme Court's Decision on Forward Looking Costs*, I Review of Network Economics 81, 84 (Sep. 2002).

71. Given this unassailable logic – and their prior statements – the incumbent economists begrudgingly concede the "theor[y]" underlying TELRIC is sound. Kahn-Tardiff (Verizon) Decl. ¶ 21; Shelanski (Verizon) Decl. ¶ 14; *see also* Kahn-Tardiff (Verizon) Decl. ¶ 19 (conceding that even where investment requires "heavy sunk costs" and there is "continuous technological change" that can be expected to devalue that investment, firms will invest the "most recent technology from the ground up" so long as they can charge rates that cover forward-looking "depreciation . . . and rates of return"). Nonetheless, they argue that "in practice" that regulators have not set the appropriate, forward-looking depreciation lives. Kahn-Tardiff (Verizon) Decl. ¶ 21. But that is a quite different (and much narrower) claim. If it were correct, the solution would not be to jettison TELRIC, but to require state commissions to use depreciation lives that best reflect how equipment values will change in the future because of anticipated technological change.

72. Moreover, the incumbent economists do not even attempt to establish this more modest criticism. If the incumbents were correct that Commission-prescribed lives are too long, one would expect to see shrinking depreciation reserves. The depreciation reserve is the ratio of accumulated depreciation divided by net plant investment and, as such, represents the share of a carrier's original investment that has already been covered by depreciation charges. The available evidence is that the incuments' depreciation reserves have been growing, not declining. As documented by Mr. Lee in his initial declaration, since the Commission adopted forward-looking depreciation lives, industry depreciation reserves – including regional Bell company

depreciation reserves – have steadily increased, and are now at all-time highs. Lee Decl. ¶¶ 15-21 & Att. 4-5. Thus, there is no empirical support for the incumbents' position on depreciation.

73. It should not be surprising that the existing lives adopted by regulators have not been proven inadequate. Contrary to the incumbent economists' suggestions (Kahn-Tardiff (Verizon) Decl. ¶ 21), the regulatory depreciation lives prescribed by the Commission and that are generally used by the state commissions are expressly based on analyses of "company plans, technological developments, and other future-oriented studies." *1999 Update*, 15 FCC Rcd. 242, ¶ 5 (1999). Hence, the "prescribed lives are not based solely on the engineered life of an asset, but also consider the impacts of technological change and obsolescence." *Universal Service Order*, 14 FCC Rcd. 20156, ¶ 427 (1999). In short, the "depreciation expense calculations based on the Commission's prescribed projection lives and salvage factors represent the *best forward-looking estimates* of depreciation lives and net salvage percentages." *1999 Update* ¶ 61.

74. The incumbent economists also complain that even appropriate depreciation lives are insufficient because they apply to a asset "base" that is potentially lower than an incumbent's "actual" investment, thus resulting in undercompensation. Kahn-Tardiff (Verizon) Decl. ¶ 22. Specifically, Drs. Kahn and Tardiff contend that existing TELRIC models reflect engineering assumptions that understate "the number of telephone poles, lengths of cables of particular sizes, central office switches, etc., needed." *Id.* The witnesses offer no evidence to support these claims. If they are correct, however, the solution is for state commissions to use appropriate engineering assumptions, not to jettison TELRIC in favor of a reproduction cost standard.

75. I do agree with the incumbents on one limited point: it is at least theoretically possible that TELRIC may lead to underrecovery of inefficiently incurred costs that are

compelled by state law.[5] In particular, the incumbents claim that carrier-of-last-resort obligations require them to maintain lower fill factors than they otherwise would. NERA (BellSouth) Decl. ¶ 22.

76. As an initial matter, this line of argument is inconsistent with the incumbents' claims that their networks are in fact efficient. And it is also not a basis for increasing UNE rates above TELRIC levels. The incumbents have offered no proof that carrier-of-last-resort obligations have in fact led to cost under-recovery. Equally important, costs that are not recovered through the incumbents' retail rates should *not* be included in wholesale UNE rates. As the Commission properly recognized in the past, such a surcharge would potentially impede the development of local competition. *Local Competition Order* ¶ 705. Rather, these costs should be recovered through appropriate, competitively neutral universal service contributions. *Id.* ¶ 707; *see also* Gregory Rosston and Roger Noll, *The Economics of the Supreme Court's Decision on Forward Looking Costs*, I Review of Network Economics 81, 86 (Sep. 2002) ("Any pricing method that allows the mistakes of the past to be made up in UNE prices that are too high is inherently anticompetitive. . . . The FCC attempted to deal with [the problem of inefficient regulatory obligations] by requiring a competitively neutral fee to make up for any embedded costs that are not paid for through the combination of ILEC wholesale and retail sales.").

77. *TELRIC Is Not Internally Inconsistent.* Second, the incumbent economists claim that the Commission's TELRIC rules are internally inconsistent. Aron-Rogerson (SBC) Decl. at 18-21; Kahn-Tardif (Verizon) Decl. ¶¶ 16-17; Shelanski (Verizon) Decl. ¶ 14. Specifically, the incumbent economists claim that while TELRIC is intended to mimic the workings of a

[5] However, depending upon the basis upon which the cost of capital is determined, such risks may very well be reflected and no additional compensation is required.

"competitive market," in practice return on capital is set on the (correct) assumption that incumbents face very little facilities-based competition for the network elements at issue.[6] Thus, the incumbents argue, to be consistent, capital costs should be based on the assumption that multiple facilities-based competitors exist. Putting aside whether this difference would require a significant adjustment to the cost of capital, the incumbent economists have failed to demonstrate any inconsistency between the theory upon which TELRIC is based and how it is implemented in practice.

78. The basic flaw in the incumbent's reasoning is that it equates the competitive market framework for application of LRIC pricing with the assumed existence of multiple facilities-based competitors. This is a *non sequitur*. Although it is, of course, correct that a market with numerous, vigorous firms will ordinarily be competitive, the existence of multiple competitors in a market is not a *necessary* condition for that outcome. Markets will also achieve competitive results when effectively *contestable*. The contestable market standard "offers a generalization of the notion of purely competitive markets, a *generalization* in which fewer assumptions need to be made to obtain the usual efficiency results. Using contestability theory, economists no longer need to assume that efficient outcomes occur only when there are large numbers of actively producing firms. What drives contestability is the possibility of costlessly reversible entry." William Baumol, John Panzar and Robert Willig, CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE xiii (rev. ed. 1988) (emphasis added); *see also generally* Willig Decl. ¶ 23 (citing authorities). Of course, this does not mean that a market with a single incumbent supplier will necessarily exhibit competitive outcomes. In many cases, such

[6] In this regard, I note that the incumbent economists are inconsistent with their claim that the incumbents currently face effective competition.

as the local telephone markets at issue here, it will not because the incumbent is protected by substantial barriers to entry. Thus, regulation, such as the pricing of access to the incumbents' facilities, is necessary to prevent the exercise of ILEC market power and to replicate the workings of a competitive market.

79. For these same reasons, the incumbents are incorrect in asserting that there is tension between TELRIC's assumption that service is provided by a "single carrier" that operates an efficient network that is capable of serving all customer locations within a particular geographic area and the competitive market benchmark for LRIC. In a fully contestable market, service may be efficiently provided by a single incumbent firm whose prices are impelled to converge to LRIC. This framework is particularly apt here, for the network elements at issue are characterized by steep economies of scale and scope (*Triennial Review Order* ¶¶ 87-90), and are most efficiently provided by a single firm. Lastly, TELRIC does not have to include the "full costs" of "obtaining the rights of way and authorizations needed to build the network today from scratch" in order to be "consistent." *E.g.*, SBC at 57. Of course, I agree with the point that the costs that an efficient provider of UNEs would incur in obtaining the necessary rights-of-way and authorizations should be included in UNE rates. The incumbents, however, appear to be contending that the costs of obtaining such authority today would be substantially greater than the incumbent itself incurred in obtaining them, as evidenced by the onerous terms that municipalities and landlords impose on competitive carriers that seek to obtain necessary rights-of-way from these entities.

80. Although the incumbents are correct that competitive carriers are subject to discrimination in access to rights-of-way, that does not mean that the terms imposed on these carriers are the appropriate ones to use in a TELRIC study. The discriminatory terms and

conditions imposed on competitive carriers for access to rights-of-way constitute a classic entry barrier in that they add up to a cost that second-mover competitive carriers incur but the incumbent avoids. *Triennial Review Order* ¶¶ 75, 205, 303-306. Specifically, municipalities and landlords have strong incentive to grant access to rights-of-way that they control to the "first mover" telephone carrier because these entities clearly want telephone services to be provided to their residents. Indeed, one can hardly imagine a municipality or landlord attracting any residents at all if telephone services were not available there. On the other hand, as the Commission confirmed in its *Triennial Review Order*, municipalities and landlords have little incentive to offer the same favorable terms to second-mover competitive carriers, and instead insist that competitive carriers pay much higher rates than the incumbents for the necessary access. *Triennial Review Order* ¶¶ 205, 303-306.

81. As explained above, the point of UNE pricing is to replicate the workings of an effectively contestable/competitive local telephone market because such competition cannot be expected to develop in light of the steep entry barriers into local markets. It necessarily follows that discriminatory barriers that prevent efficient entry should *not* be included in determining UNE rates. Instead, the appropriate costs for calculating UNE rates are those that the first-mover carrier would incur in efficiently acquiring the necessary rights-of-way. And, for the reasons explained above, those costs could be expected to be relatively low, for municipalities and landlords have a powerful incentive to ensure that their residents are able to send and receive telephone calls.

82. *TELRIC Does Not Retard Efficient Investment.* The incumbent economists claim that TELRIC deters network investment by incumbents. *See, e.g.*, Hazlett *et al.* (Verizon) Decl. ¶¶ 11-19; Kahn (Verizon) Decl. ¶ 29; NERA (BellSouth) Decl. ¶ 26. At bottom, however, this

argument is simply a repackaging of the incumbents' primary argument that TELRIC is not compensatory because incumbent carriers "in the real world" can never achieve a cost structure close to LRIC (or, correlatively, that UNE prices are "below-cost"). But for the reasons explained above, so long as TELRIC-based rates permit a return on investment that reflects the *ex ante* risks associated with investing in a fully constestable market, TELRIC is fully compensatory. *See also* Willig Decl. ¶¶ 42-44. Competition fostered by the 1996 Act also gives incumbents added incentive to improve their networks in order to avoid losing customers to new entrants. *Verizon* at 517 n.33 (it is "commonsense . . . that so long as TELRIC brings about some competition, the incumbents will continue to have incentives to invest and improve their services to hold on to their existing customer base").

83. Verizon also contends that TELRIC sends inappropriate signals to competitive carriers. According to this contention, competitive carriers should be encouraged to self-deploy their own facilities whenever they can do so more cheaply than incumbent carriers. Kahn-Tardiff (Verizon) Decl. ¶ 29; Shelanski (Verizon) Decl. ¶ 17. However, the incumbents maintain that because TELRIC is lower than the incumbents' "actual forward-looking" costs, competitive carriers will lease UNEs even when they could self-deploy their own facilities.

84. This argument suffers from several independent flaws. Foremost, whatever its theoretical merits, it has no applicability to the UNEs mandated by the Commission. In the *Triennial Review Order*, the Commission held that incumbents must provide unbundled access only to those parts of the network that could not be economically duplicated by competitive carriers because of the natural monopoly characteristics of the underlying facilities. Thus, the prices that incumbents charge for a UNE can be expected to have no impact on the ability of

competitive carriers to self-deploy that UNE. Rather, allowing incumbent carriers to charge higher prices would simply foreclose meaningful UNE-based retail competition.

85. But more fundamentally, the incumbents' simplistic notion that more "investment" is better is contrary to sound public policy – as the other incumbent economists acknowledge. *Accord,* NERA (BellSouth) Decl. ¶ 27 ("The level of UNE prices must not be viewed as a part of the regulatory toolkit for encouraging just *any* entry, even inefficient entry."); Weisman (Qwest) Decl. ¶ 18 ("The proper incentives for efficient investment in network infrastructure is critical to realizing the goals of the Telecommunications Act. Artificially high TELRIC measures could be expected to result in over-investment in facilities-based networks."). In implementing the unbundling provisions of the Act, the Commission should instead seek to establish prices for telecommunications services that (i) steer purchasers to the most efficient, least-cost suppliers of each good or service for which there is sufficient demand; (ii) guide purchasers to make efficient choices among different goods and services offered in the market; and (iii) achieve the level of cost recovery that encourages efficient levels of investment, entry and exit.

86. If competitive carriers cannot deploy facilities at the LRIC of an efficient provider, then that investment is socially wasteful. By definition, LRIC-based rates represent the economic cost of the facilities used to provide a UNE. Thus, where a competitive carrier can only deploy a facility at a cost higher than the LRIC of that facility, it is inefficient and socially wasteful for it to do so. In contrast, where a competitive carrier can secure services equivalent to those of a UNE at a cost at or below the UNE's LRIC, it is efficient for the competitive carrier to do so.

87. At the same time, one must also recognize that competitive carriers have strong incentive to deploy their own facilities whenever feasible, even if they could obtain UNEs at a lower cost. The reasons should be obvious: a competitive carrier that owns its facilities avoids dependence on its largest competitor for essential inputs.

88. This basic economic theory is supported by hard econometric evidence. Along with several colleagues, I have conducted econometric studies that measure the cross-sectional variation in the terms and conditions upon which UNEs were available in the various states in order to test the linkage between the availability of UNEs, competitive LEC activity, and incumbent LEC activity. Robert D. Willig, *et al.*, *Simulating Investment and the Telecommunications Act of 1996* (filed in CC Docket Nos. 01-338 *et seq.*, Oct. 11, 2002). Employing standard econometric procedures, these studies were able to estimate how incumbent network investment was influenced by local competition, particularly local competition that resulted from UNE-P. Overall, this evidence shows a 1% reduction in UNE-P rates corresponds with approximately a 2.1% to 2.9% increase in incumbent investment.

89. Although the incumbents economists do not challenge my prior work, the Commission in the *Triennial Review Order* did raise a number of potential objections to that analysis. First, the Commission suggested that it might be "methodologically suspect" to measure investment in the cross-section sample relative to population. *Triennial Review Order* ¶ 178 n.576. Without explaining why, the Commission concluded that a normalization by Bell operating company ("BOC") access lines would be "more direct." *Id.*. Second, the Commission characterized some of the variables used in my econometric study, namely UNE prices, average revenue per access line and the incumbent LEC cost of investment as "not well explained," and "subject to significant errors." *Id.* The Commission suggested that, since the original estimation

was made without the use of a calculation method known as "robust standard errors," that "conclusions about statistical significance could be inaccurate." *Id.* Neither concern is well-founded.

90. The suggestion that investment should be normalized by BOC access lines because doing so is "more direct" is vague. It is not clear what economic or statistical meaning is meant to be conveyed by the phrase "more direct." In any event, in the context of the full specification employed in our model, the suggestion is misplaced. There are good reasons to believe that normalization by population is to be preferred.

91. The economic relationship that we estimate is the relationship between the optimal rate of incumbent investment and the supply and demand forces that determine the profitability of such investment. Thus, the specification includes variables that measure in each state the share of the labor force employed in telecommunications intensive industries, the level of economic activity, growth, the initial size of the telephone-relevant capital stock in place, and the regulatory environment. The specification also includes measures of the cost (TELRIC) of new investment, revenue that can be earned per line and the level of competitive carrier activity. The normalization by population that we employed builds into the estimation the expectation that after controlling for these demand and supply forces, incumbents in a larger state (as measured by population) may be expected to make proportionally larger investments.

92. If we were to replace that normalization with the normalization suggested by the Commission (BOC lines), then the expectation built into the estimation would be that after controlling for economic factors, incumbent carriers in a state with more BOC lines should be expected to make proportionally greater investments. The Commission has itself noted, however, that, "BOC access lines as a percentage of state population vary significantly." *Id.* To

the extent that this is true even after controlling for demand and supply factors (a possibility that is not unlikely given the variation in regulatory history across states), this variation could exert a distorting effect on the estimation process. In states that are relatively "overbuilt," for example, the number of BOC access lines relative to population is likely to be large. In such states incumbent investment is likely to be modest because profitable opportunities are less abundant, but the normalization suggested by the Commission anticipates that incumbent investment should be larger. Likewise in states that are relatively "underbuilt," the number of BOC access lines relative to population will be small. In these states incumbent investment may be expected to be large because profitable opportunities are more abundant, but the normalization suggested by the Commission anticipates that investment in such states will be small.

93. In short, the normalization suggested by the Commission is inconsistent with the underlying economics of the investment process that is being estimated. Employing that normalization runs the risk of distorting the estimates in a way that conceals the relationships between investment demand and its economic determinants.

94. Notwithstanding the conceptual weakness of the Commission's suggestion, I have, along with some of the co-authors of my study, re-estimated our model using the normalization suggested by the Commission. The re-estimation creates no meaningful change in our findings. With only two minor exceptions, the estimated coefficients carry the same signs and levels of statistical significance that we reported in our white paper.[7]

[7] The two exceptions produce only minor changes in the results. First, in the incumbent carrier reduced form equation where the dependent variable is investment to 2000, the coefficient on the labor force growth variable is significant at the 94% level instead of 95%. Second, in the incumbent carrier reduced form equation where the dependent variable is investment to 2001, the UNE price coefficient is negative and significant at the 98% level instead of 99%.

95. The Commission's concern that robust "standard errors" would reveal weaknesses of our estimation is similarly misplaced. Again, while I believe that the techniques used in my prior analysis are sound, my colleagues and I have re-estimated our model with robust standard errors. We obtain the same results with respect to the signs and statistical significance of our estimates, with only a few minor exceptions.[8] Combining both of the Commission's suggestions — that is, normalizing investment by lines and employing robust standard errors—produces results that do not vary in any statistically meaningful respect from those reported in my prior white paper.[9]

96. As noted, the incumbents make no attempt to critique this careful econometric analysis. Instead, the incumbents proffer a competing analysis by Hazlett, Havenner and Bazelon. *See* Hazlett *et al.*(Verizon) Decl. ¶¶ 11-19. This analysis is entitled to no weight. The Hazlett-Havenner-Brazelon declaration is a sequel to an earlier analysis submitted to the Commission. Hazlett *et al.* (Verizon) Decl. ¶ 4 & n.1. In that earlier analysis, they concluded

[8] The exceptions are as follows. In the incumbent carrier reduced form equation where the dependent variable is investment to 2000, the average revenue variable is significant at the 98% level instead of 99%, but the UNE price is significant at the 99% level instead of 95%. In the ILEC reduced form equation where the dependent variable is investment to 2001, the TELRIC variable is significant at the 98% level instead of 99%. In the incumbent carrier structural form equation where the dependent variable is investment to 2000, the competitive activity variable is significant at the 99% level instead of 95%, and the average revenue variable is significant at the 94% level instead of 95%. In the incumbent carrier structural form equation where the dependent variable is investment to 2001, the significance level on the average revenue variable drops from 95% to 94%.

[9] Overall, the exceptions are as follows. In the incumbent carrier reduced form equation where the dependent variable is investment to 2000, the significance level on the average revenue variable drops from 99% to 97%. In the incumbent carrier reduced form equation where the dependent variable is investment to 2001, the significance level on the TELRIC variable drops from 99% to 98% and drops from 99% to 97% on the UNE price. In the incumbent carrier structural form equation where the dependent variable is investment to 2000, the significance level on the competitive carrier activity variable increases from 95% to 99%, but the significance level on the average revenue variable drops from 95% to 93%.

that, "the availability of UNE-P at TELRIC prices appeared to be having a strongly negative impact on telecommunications investment." *Id.* ¶ 11. In the current declaration, they seek to buttress that conclusion by reviewing telephone company dividend policies and by carrying out an econometric analysis of the "stepping-stone" hypothesis that competitive carriers who will eventually build their own facilities will initially rely on network facilities provided by incumbent carriers.

97. In the view of Hazlett *et. al.*, the dividends paid by telephone companies are evidence that they lack investment opportunities. "If UNE-P, which is rapidly rising, increased the incentive of carriers to invest, dividends paid by such firms would be constrained. That is, firms would tend to re-invest their earning rather than paying them out to shareholders. . . . This is why firms with high growth potential (*i.e.*, opportunities to invest in profitable projects) tend to pay relatively smaller dividends than firms without such opportunities." *Id.* ¶ 14. In other words, according to Hazlett *et. al.*, telephone companies, both incumbents and new entrants, must lack for investment opportunities because if such opportunities existed, then the companies could not afford to pay dividends.

98. This reasoning is flawed. Effectively, Hazlett *et al.* are assuming that the firms in question do not have access to capital markets. According to this view, investment financing from external sources is so expensive that only internal funds may profitably be used to finance even attractive projects. The opposite, of course, is true. Additionally, this point of view over-simplifies the complexities of optimal financial dividend policy by neglecting the reasons why a

firm might find it in its interests to pay dividends at the same time that it raises outside capital with which to finance new investment.[10]

99. In any event, the specifics of the Hazlett *et al.* submission are flawed. Turning to their econometric analysis of the "stepping stone" hypothesis, they seek to test this hypothesis by estimating a relationship in which six month and one year lagged values of UNE-P lines and the current unemployment rate are used as independent variables to explain the current level of competitive carrier lines relative to BOC lines. They conclude that the stepping stone hypothesis may be rejected because they do not find a statistically significant relationship between lagged UNE-P lines and competitive carrier lines.

100. This analysis contains a variety of errors. First, the estimated equation represents only the possibilities of a relationship between UNE-P lines and competitive lines over a six month or 12 month time span. To the extent that the transition period for competitive carriers to move from UNE-P lines to their own facilities is longer than 12 months, this estimation is incapable of capturing that relationship. In view of the legal and regulatory uncertainty that has surrounded the question of UNE pricing during the last two years, it is easy to believe that the time frame for making this transition is likely to be considerably longer than 12 months.

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[10] Although academics in the finance community have argued that in perfect capital markets dividend policy is irrelevant, finance textbooks generally recognize that in the the real world, firms have incentives to maintain predictable dividend policies. As Brigham, Gapenski, and Daves explain, "firms should try to establish a rational dividend policy and then stick with it. Dividend policy can be changed, but this can cause problems because such changes can inconvenience the firm's existing stockholders, send unintended signals, and convey the impression of dividend instability, all of which can have negative implications for stock prices." Eugene F. Brigham, Louis Gapenski, and Phillip Daves, INTERMEDIATE FINANCIAL MANAGEMENT 466 (1999). The notion, implicitly advocated by Hazlett *et. al.*, that companies pay dividends only when profitable investment opportunities are unavailable and suspend dividends when such opportunities do exist, flies in the face of this wisdom.

101. Most egregiously, the estimating equation employed by Hazlett *et. al.* is mis-specified because it includes no prices. In other words, Hazlett *et. al.* have based their conclusion on a model that assumes that neither the cost of UNEs, as embodied in UNE-P prices, nor the cost of facilities-based investment, as embodied in TELRIC, plays any role in determining the level of facilities-based competitive carrier investment. This is a fundamental economic error, and one that my own econometric results demonstrate empirically to be important. It is elementary econometrics that this kind of omission imparts a bias to the estimates of the remaining coefficients. On this basis alone, the results obtained from the regression work of Hazlett *et. al.* are too unreliable to be credited.

102. *TELRIC Is Not Too Hypothetical To Be Reasonably Implemented.* Lastly, the incumbent economists retreat to their shop-worn claims that, whatever its theoretical merits, LRIC-based pricing is too "hypothetical" to be implemented in practice and results in widely varying cost estimates. Aaron-Rogerson (SBC) Decl. at 35-38; Eisenach-Mrozek (USTA) Decl. ¶¶ 3-5; Shelanski (Verizon) Decl. ¶ 19. In accompanying reply declarations, AT&T witnesses testify that there are no accurate factual predicates for this argument. John Klick testifies in his reply declaration that, while there have been variations in the rates determined by state commissions, these variations are largely the result of relevant cost differences between those states. Further, John Klick testifies that in many cases the "variance" alleged by the incumbents is the result of inconsistent positions taken by the incumbents themselves. In his reply declaration, Dr. Selwyn testifies that the Aron-Rogerson and Eisenach-Mrozek "regression" analyses are based on statistical techniques that are fundamentally flawed.

103. To be sure, there have been differences of opinion and some outright errors by state commissions in applying TELRIC (both upwards and downwards), but that too is inherent

in a federal regulatory scheme that allocates decision-making authority among the state commissions. As long as each state commission has authority to set UNE prices within its jurisdiction, differences in cost findings are apt to occur regardless of the particular costing methodology the Commission mandates. As Mr. Klick shows in his reply declaration, as the state commissions have gained experience with TELRIC, the variations in methodology across the country have been reduced. In the earliest TELRIC rate proceedings, state commissions did produce widely divergent rates; indeed, some states adopted absurdly high rates for certain UNEs. In this regard, I understand that as state commissions have learned from their own experience and from other states, UNE rates (adjusted for cost differences) are converging in a more narrow range, and UNE-based entry has increased markedly over the last two or three years as a result.

104. The reason why TELRIC has not generated widely varying (cost-adjusted) rates is that, as explained by AT&T's witnesses that have working experience implementing TELRIC, current TELRIC models accurately incorporate the real-world variables that are relevant to determining the economic costs of providing telephone service. Although TELRIC may disregard the incumbents' "existing" network design and operational practices, it does not ignore relevant exogenous constraints such as routing and topography. Bryant Essay at 11. The increasingly precise identification of customer locations has also increased the realism with which models account for natural geographic obstacles such as rivers and mountains. Modern TELRIC models that rely on detailed customer location data automatically account to some extent for natural obstacles to building telephone plant. Moreover, in each cluster (and where plant must be placed to connect clusters), the cost models expressly incorporate highly detailed

data regarding local soil conditions (rock, sandy, dirt), water table depths, and other terrain characteristics that affect the cost of building and installing telephone plant. Klick Decl. ¶ 57.

105. In contrast, the reproduction cost standard would be intrinsically more difficult to apply. A methodology relying more on the incumbent's "actual" network would require an exponential increase in the amount of discovery necessary from the incumbents. But even this would be unavailing. As Mr. Klick explained at length in his initial declaration, plant records are not maintained in generally consistent formats by the incumbents. Some localities may have electronic records and maps, others may have only hard copies in idiosyncratic formats. Further, as noted above, there is evidence that the incumbents' book costs are inflated by listings of investment in equipment that is not currently even to be found at the location stated in the incumbent's plant records. Moreover, network element rates must reflect the different costs in zones having different population densities and terrain, but, as the Commission has previously recognized, the incumbents' books provide investment figures only on a statewide basis for broad categories of network and other equipment. *See, e.g., Universal Service Order* ¶¶ 226, 232. Therefore, accurate UNE rates would require either extensive discovery to determine the incumbents' costs on a sufficiently disaggregated and local basis, or would require inherently arbitrary allocations of statewide costs.

106. The discovery necessary to develop accurate information about the incumbents' "actual" networks would increase the complexity of TELRIC rate proceedings enormously. As noted above, incumbents are in sole possession of much of the relevant evidence concerning their networks, and experience has starkly confirmed that no state commission could accept incumbent representations about their networks at face value. It is notoriously difficult, however, to extract the necessary information from the unwilling incumbents. The Supreme

Court expressly recognized this difficulty with alternatives to TELRIC: "[t]o the extent that the traditional public-utility model generally relied on embedded costs, similar sorts of complexity were exacerbated by an asymmetry of information, much to the utilities' benefit." *Verizon*, 535 U.S. at 522 (emphasis added); *see id.* (reliance on the incumbent's network would "preserve home-field advantages for the incumbents"). One of the principal benefits of TELRIC is that it reduces these administrative difficulties

IV. THE INCUMBENTS' PROPOSED CAPITAL COST "ADDITIVES" ARE CONTRARY TO SOUND ECONOMICS.

107. Given their concession that so long as TELRIC-based rates include an appropriate risk-adjusted cost of capital, the resulting UNE rates will be fully compensatory, the incumbents go to great lengths to argue that the existing techniques used to calculate capital costs are deficient. But the existing techniques used to compute the cost of capital are well established and known to provide accurate cost of capital estimates – indeed, they are the same techniques that have long been used by regulators and financial economists. In an accompanying reply declaration, Terry Murray testifies on technical aspects of the alternative methodologies proposed by the incumbents and the flaws found in those methodologies. Terry Murray proceeds to testify on the analytical techniques found to be appropriate for computing the cost of capital.

108. In this section, I focus on two conceptual issues. The first concerns the incumbents' claims regarding the relevant "proxy" group of firms for estimating the cost of capital. The second concerns the incumbents' claims that any cost of capital estimates should be "grossed up" to account for various types of risks and forgone options that they claim to be aware of, but that they claim today's capital markets have ignored. In each instance, the incumbents' advocacy is contrary to sound economics.

A. The Relevant Proxy Group.

109. Whether state commissions employ the discounted cash flow ("DCF") technique or the capital asset pricing model ("CAPM") for determining capital costs, they must base their calculation of available market data from a "proxy group" of companies that bear a risk profile comparable to the risks of the entity at issue here: an efficient provider of UNEs. I understand that state commissions generally use the regional Bell operating companies as the proxy group in such calculations. In their comments, some of the incumbents challenge this proxy group. *But see* SBC at 45 ("SBC submits that ILEC holding companies are a fair – indeed, conservative – proxy group to use in estimating the cost of equity").

110. The incumbents argue that the goal of the cost of capital calculation should be to assess the risks of a firm that provides *only* UNEs, or only the UNE component of a multi-product firm. *E.g.*, Vander Weide (Verizon) Decl. ¶ 44. And the incumbents claim that using the regional Bell holding companies as the proxy group substantially understates the risk of such a business because regional Bell holding companies are able to reduce risk below that of the UNE-only portion of their business by diversifying into other lines of business. The Bells' argument is economically flawed.

111. As a preliminary matter, it is not at all clear that diversification has made the regional Bell holding companies less risky than would be a UNE-only company. While diversification of a portfolio can decrease risk, it is not necessarily true that the portfolio is less risky than each of its components. For instance, a portfolio that holds a risk free asset, say a three month Treasury bill, and that also holds a high-tech stock, may be less risky than the high-tech stock alone, but certainly would not be less risky than the three month T-bill alone. So too here, the fact that the regional Bell holding company is diversified does not mean that it has

lower risk than each of the components of the holding company. Indeed, as other witnesses have noted, many of the other lines of business engaged in by the regional Bell holding companies are apt to be considerably riskier than the supply of UNEs. Thus, using the incumbents' networks to estimate the cost of capital might well result in a conservatively *high* estimate of the cost of capital. That problem can be addressed by state commissions to the extent that they are able to identify and make adjustments for those disparities in risk when computing the cost of capital.

112. But even if the incumbents are correct that the "diversification" undertaken by the regional Bell holding companies lowered risk, that only indicates that the correct proxy for an efficient UNE provider is a firm with the structure of a regional Bell holding company. Basic economics teaches that an efficient firm will take full advantage of all available efficiency opportunities, including economies of scale and scope. An efficient UNE provider, therefore, will size its network to account optimally for scale economies, and will take advantage of any additional efficiencies associated with economies of scope by integrating with a firm that deploys and sells, at efficient levels, products and services that are related to the sale of UNEs. In telecommunications markets, these additional sales potentially include retail services, long distance services, broadband services, maintenance services, retail and wholesale customer services, and so on. On the other hand, failing to recognize these economies of scale and scope would inflate the costs of selling UNEs, because it would ignore the economic fact that a carrier that has deployed facilities to serve an entire geographic area can spread its costs over additional customers in that area who are willing to purchase other services that can be provided over those UNEs, rather than only the limited subset of UNE customers and the limited subset of UNE services.

113. This analysis is consistent with the *Triennial Review Order*. There, the Commission stated that it would determine whether a carrier is "impaired" in its ability to self-deploy a UNE by examining "the availability of scale and scope economies gained by providing multiple services to large groups of customers" using that UNE. *Triennial Review Order* ¶ 115; *see also id.* ¶ 519 ("The state must also consider the revenues a competitor is likely to obtain from using its facilities for providing data and long distance services and from serving business customers"); *id.* n.1585 (the impairment analysis "will therefore take into account the scale and scope economies available to carriers using existing facilities to provide a variety of services to all customers that are likely to be served by an efficient entrant"). Verizon's expert implicitly concedes this point. Vander Weide (Verizon) Decl. ¶¶ 44-47 (noting that carriers can reduce cost of capital by diversifying its assets").

114. The proposed alternative "proxy" groups advanced by Verizon, BellSouth and Qwest are clearly less appropriate than using the regional Bell operating companies. Verizon and BellSouth advocate using the firms in the S&P 500 as a proxy for efficient providers of UNEs. But such firms plainly are not representative of an efficient UNE provider. For example, International Flavor and Fragrance is an S&P 500 company, and its primary line of business – consumer products such as fragrances and toiletries, soaps, and detergents – have little relationship to the telecommunications industry. Likewise, the market price of Exxon Mobil reflects the substantial environmental and political risks (such as outright expropriation of its assets) inherent in the petroleum business. Software companies like Oracle face the risks of products with short lifecycles and any law or court decision that changes the scope of their intellectual property rights. All of these firms, as well as most of the other 497 firms in the S&P 500 face different risk characteristics and capital requirements than an efficient provider of

UNEs. They require different capital outlays, different types of capital stock, different capital depreciation lives – indeed, different almost everything. There is no reason to think that the risks, and hence costs of capital, associated with these firms are representative of those for an efficient UNE provider. As the Wireline Competition Bureau explained in rejecting the use of the S&P 500 firms as a proxy for an efficient provider of UNEs:

> The businesses of most of Verizon's S&P 500 based proxy group of companies have no obvious similarity to the provision of local exchange services, and Verizon did not describe any. Consequently, there is no basis on which to conclude that this proxy group best represents the risks that Verizon would face it if faced facilities-based competition.

Virginia Arbitration Order 18 FCC Rcd. 17722, ¶ 90 (2003). It is thus clear that there is no justifiable basis for using the cost of capital of firms in the S&P500 as a proxy for the cost of capital of an efficient provider of UNEs.

115. Qwest's proposal to use competitive and long distance carriers as a proxy for computing the cost of capital of an efficient UNE provider also is untenable. As a preliminary matter, unlike the incumbents, competitive local carriers and long distance carriers are not in the wholesale UNE business, making them unqualified as proxies for an efficient UNE provider. Moreover, the competitive risks and current cost of capital of competitive carriers and long distance carriers are much higher than that of an efficient UNE provider carrier in a contestable market. Competitive local carriers are new entrants in markets dominated by the legacy-monopoly incumbent carriers, and have obtained only small footholds in those markets. As a result, the competitive carriers face substantial barriers to entry, and a far greater likelihood of economic losses than would efficient sellers of UNEs. Long distance carriers now face competition from the Bells, who are able to self-supply their own access at economic costs and have an established relationship with the long distance carriers' customers. For these reasons,

the cost of capital of competitive carriers and long distance carriers substantially exceed of an efficient UNE provider.

B. Risk Premiums & Options.

116. The incumbents argue that the existing techniques for computing the cost of capital fails to account for "special" risks faced by the incumbent. The incumbents' identify four purported special risks: (1) competitive market risk; (2) regulatory risk; (3) lease cancellation risk; and (4) "options" or "sunk cost" risk. Pindyck (Verizon) Decl. ¶¶ 7-22; Vander Weide (Verizon) Decl. ¶¶ 8-39. As demonstrated below, these "risks" are accounted for by the current cost of capital methodologies because current methodologies are based on the expectations of financial markets, which account for such risks. Moreover, certain of the purported "risks" identified by the Bells, may actually be "upside" risks that, if separately incorporated into the cost of capital, would result in *lower* cost of capital estimates.

117. *Competitive Risk.* There can be no serious claim that the cost of capital should be grossed up to reflect additional "competitive risk." Even Verizon's cost of capital witness concedes that "[c]ompetitive market risk is included in estimates of the market cost of capital." Vander Weide (Verizon) Decl. ¶ 14. That is because cost of capital estimates are based on equity prices and growth expectations as determined by financial markets, and financial markets in setting such prices and expectations account for all available and relevant information, including competition-related risk. This is true regardless of the group of firms that are used as a "proxy" to estimate the cost of capital. According to the incumbents, they face "vigorous" and "growing" competition" and so do firms in the S&P 500, and so do competitive local carriers and long distance carriers. Financial markets have thus already incorporated competitive risk factors in setting the prices and growth expectations that are used in the cost of capital models. Indeed,

investors have had nearly eight years to incorporate the financial impacts of competition into their forecasts. There is no serious evidence in this record of any need for further adjustment.

118. *Regulatory Risk.* There is obviously no need to account separately for "regulatory risk" if the incumbents are the proxy group of firms used to compute the cost of capital, because the financial markets' prices and growth expectations used to compute the cost of capital would fully reflect such risk. Indeed, it is certainly no secret to the financial community that firms selling UNEs are subject to various regulatory requirements, including the unbundling obligations imposed by the 1996 Act, and the TELRIC pricing standard established by this Commission. The cost of capital using the incumbents as proxy firms thus fully reflects any risk associated with regulation.

119. The incumbents' claim that regulatory risk must be added to the cost of capital is thus tied to the incumbents' flawed claim that the cost of capital should be based on a proxy group of firms that are not involved in the sale of UNEs or, in many cases, not even involved in the telecommunications industry. The cost of capital of such firms obviously would not reflect regulatory risks in the telecommunications industry. The incumbents thus urge the commission to adjust the cost of capital upward to account for that risk. The incumbents' arguments, however, are misguided.

120. It is important to recognize what the incumbents are actually asking the Commission to do here. The incumbents are asking the commission to identify and make adjustments to the cost of capital estimates to account for different regulatory risks associated with the group of proxy firms and the hypothetical efficient UNE provider. That is no small endeavor. It would require the Commission (or state commissions) not only to account for risks that are absent in the proxy firm industries, but also would require the *subtraction* of risks that

are present in the proxy firm industries, but absent from the telecommunications industry. As noted, the S&P 500 firms, for example, include railroads and electric utilities, each of which face substantial regulatory risks. The S&P 500 firms also include large companies that are subject to environmental regulatory risk (especially industrial companies that have been identified as polluters), safety-related regulatory risk (*e.g.,* car manufacturers), products liability regulatory risk (e.g., tobacco and pharmaceutical manufacturers), and so on. Such risks would have to be removed from any cost of capital estimate that uses these firms as a proxy while adding any telecommunications-specific regulatory risk. It would be very poor policy, and certainly bad economics, to add telecommunications-related regulatory risk without removing these other non-telecommunications regulatory risks.

121. Even if the Commission adopted the inconsistent approach proposed by the incumbents and attempted to account for telecommunications regulatory risk without subtracting regulatory risk for the proxy companies, it is not at all clear that the telecommunications regulatory risk would, on net, increase the cost of capital. Regulation in the telecommunications industry in some cases increases the incumbents' risk, and in other cases *reduces* the incumbents' risk. As one example, the Commission oversees a universal service mechanism that is supposed to ensure that carriers serving certain "high cost" customers fully recover the cost of serving those customers, which may be on net a risk-reducing regulation.

122. *Lease Cancellation Risk.* Lease cancellation risk, as described by the incumbents, refers to the risk that a competitor may cancel a lease for unbundled network elements. As with regulatory risk, there is obviously no need to account for lease cancellation risk separately if the incumbents are the proxy group of firms used to compute the cost of capital, because the financial markets' prices and growth expectations used to compute the cost of capital would fully

reflect such risk. It is no secret to the financial community that competitors lease unbundled network elements, and that they may cancel such leases. Indeed, interconnection agreements (which contain UNE lease terms) are publicly filed; their terms and conditions are a matter of public record that the investment community can review and assess. Moreover, most other major services offered by the incumbents – including retail local service, long distance and wireless service – are also provided under contracts that allow the customer to cancel on relatively short notice, compared with the life of much of the sunk investment needed to provide the service. Indeed, because of state regulation, many incumbent retail customers have broad rights to cancel service without penalty and incumbents are often constrained in their ability to collect debts owed by their retail customers. These facts are also no secret to investors. There is no evidence against the proposition that the cost of capital using the incumbents as proxy firms thus fully reflects any risk associated with competitors' cancellation of leases.

123. The incumbents' claims that the cost of capital computations should be increased to account for lease cancellation risk is therefore, like regulatory risk, tied to the incumbents' proposal to use non-incumbent firms as a proxy when computing the cost of capital. But, as noted, such a one-sided risk adjustment for such proxy firms – compensating for telecommunications risk, but not compensating for risk that is endemic to the firms in the proxy group – must be rejected. There is simply no sound economic basis for adjusting the cost of capital computed using non-telecommunications firms as a proxy group, but not making adjustments to account for risks that are unique to the proxy firms.

124. In any event, the incumbents' claim that making their proposed one-sided risk adjustment would necessarily increase risk does not withstand scrutiny – as state commissions

that have recently been presented with these arguments have concluded.[11] Under the incumbents' theory, when a competitor cancels a lease, the incumbent somehow is worse off. But that is only true in two narrow circumstances: (1) where the competitor transitions the customer to non-incumbent owned facilities and (2) where the customer previously served by the competitor using the unbundled network elements becomes unprofitable even for the incumbent. In virtually all other cases, the cancellation of a UNE lease is good news for the incumbent. When the customer cancels a lease, it means that the competitor will no longer be using UNEs to serve that customer, and that the incumbent can use the facilities that were formerly leased to the competitor to sell services to that customer, thereby obtaining retail rates rather than wholesale rates for those facilities. In short, in most circumstances, lease cancellation in the realm of unbundled network elements is often beneficial to the incumbents. Any adjustments to account for lease cancellation, therefore, might well decrease, not increase, the cost of capital.

125. *Options Risk & Sunk Investment Risk.* The incumbents' proposals to add a risk premium to account for "options risk" misapplies options risk theory to TELRIC. According to the incumbents, under the current regulatory regime, incumbents must make "sunk" cost investments today to make UNEs available to competitors, commitments that eliminate the incumbents' "option" to make those investments in the future. The incumbents' argue that because the option to delay making sunk investments has a value, the incumbents' "costs" are greater than those computed using traditional cost of capital techniques. This analysis is inaccurate and incomplete.

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[11] Order No. 24,265, *Verizon New Hampshire Investigation Into Cost Of Capital Order Establishing Cost Of Capital*, Docket No. DT 02-110, at 42-43 (New Hampshire PSC, January 16, 2004).

126. As a preliminary matter, as noted, the current cost of capital techniques use current stock prices and financial market growth expectations to compute the cost of capital. Financial markets are, of course, fully aware of the costs associated with making sunk investments today and, therefore, the equity prices and growth expectations of the financial markets fully reflect options costs and benefits. As a result, options costs and benefits are fully reflected in the current cost of capital techniques, and no additional adjustment is necessary. In this regard, Verizon's witness, Professor Pindyck, appears to recognize that the options value may already be implicitly incorporated into the current cost of capital techniques, for he is careful to state that such "options" costs are not "*explicitly*" reflected in those models. Pindyck (Verizon) Decl. ¶ 23.

127. In any event, other well respected economists have recognized that even if an options additur were appropriately incorporated into the cost of capital, it is not clear that the additur would be positive. Indeed, it might well be zero or negative. Professor William J. Baumol, for example, found that general options theory relies on assumptions that are not valid when assessing the pricing of unbundled network elements. *See* William Baumol, *Options Value Analysis and Telephone Access Charges*, THE NEW INVESTMENT THEORY OF REAL OPTIONS AND ITS IMPLICATIONS FOR TELECOMMUNICATIONS ECONOMICS (1999). Professor Baumol explained that the incumbents' option analysis implicitly assumes that the provision of UNEs requires the incumbents to make positive net sunk investment in facilities, while that assumption is highly suspect. As articulated by Professor Baumol, "the grant to the [competitors] . . . of access to the LECs' facilities is likely to require little, if any, expanded investment commitment" because

> if [competitive] . . . entry into the local telecommunications markets is successful, it will mean that the LECs will lose some of their local business to the new entrants (presumable made up for by the LEC entry into the interexchange arena). In terms of local traffic, the transfer of some traffic from LECs to the

> [competitors] . . . will reduce the LECs' use of their own facilities, leaving unused capacity available for rental to the [competitors]. Thus, the entry should result in little, if any, need to expand capacity and investment. More than that – in the debates of over the proper access charges before the many regulatory agencies involved in the process, *the LECs have repeatedly contended that entry will leave them with substantial stranded assets.* But this is tantamount to saying that, far from having to *expand* capacity, the LECs expect to have considerable excess capacity left on their hands. They patently cannot have it both ways – they cannot legitimately claim at the same time that entry will force them to make substantial new investment commitments with high option-value costs, and that entry will leave them with a significant burden of excess capacity.

Id. at 217. Simply put, if the incumbents will not be required to make new sunk investments to provide unbundled network elements, there is no forgone option to delay such investment. Here, the incumbents have made no showing that they are required to make any appreciable new investment to justify any option premium. Moreover, where the incumbent lacks facilities or spare capacity to provide UNEs, the 1996 Act as I understand it, does not require incumbents to make the investments needed to provide the capacity. *See Triennial Review Order* ¶ 636. As Verizon has stated, "the Act does not require [it] to construct network elements . . . for the sole purpose of unbundling those elements for AT&T or other carriers." [12] "Where the facility or equipment does not exist in Verizon's network, it is not used in the provision of a telecommunications service and it's not available for unbundling."[13] Likewise, the Commission has found that, when "spare facilities and/or capacity on those facilities is unavailable, Verizon will not provide new facilities solely to complete a competitor's order for high capacity loops." *Pennsylvania 271 Order*, 16 FCC Rcd. 17419 ¶ 91 (2001).

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[12] *Application by Verizon for Authorization to Provide In-Region, InterLATA Services in State of Virginia*, FCC WC Docket No. 02-214, Ex parte letter from Ann Berkowitz, Verizon, to Marlene Dortch, FCC (Oct. 16, 2002), pp. 1-2.

[13] *Application by Verizon for Authorization to Provide In-Region, InterLATA Services in State of Virginia*, FCC WC Docket No. 02-214, Ex parte letter from Ann Berkowitz, Verizon, to Marlene Dortch, FCC (Oct. 1, 2002), pp. 1-2.

128. Further, even if an incumbent in fact made such investments in the past, there is no basis for recovering any forgone options costs of those investments. The costs of options foregone in the past are sunk, and thus irrelevant to forward-looking costs. In addition, the incumbent carriers have already received compensation for any past sacrifice of the option of delaying investment in local telephone facilities caused by the unbundling and interconnection obligations of the 1996 Act. In exchange for the unbundling obligations, Congress gave the incumbents affirmative and valuable rights, including the right to enter the long-distance market.

129. Finally, even assuming (counterfactually) that the incumbents were required to make UNE-specific investments on a forward-looking basis, it is not clear that the option value of that investment would increase the cost of capital. Sunk investment has at least two option-related effects. First, sunk investments eliminate the option of delaying those investments to the future, which is the "cost" identified by the incumbents. Second, sunk investments provide the incumbents with the option of building on those assets in the future, which is a "benefit" ignored by the incumbents.

130. That there are "option" benefits to making the sunk investment is intuitive. Consider a new business complex that currently lacks telephone service. The incumbent can either build facilities to that business today, or delay such deployment. By deploying telecommunications facilities to the business today, the incumbent loses the option of delaying those investments. But the incumbent also gains the "option" to deliver those services without incurring the massive additional costs associated with being the "second mover" in a market where there are substantial benefits to being the "first mover." The incumbent also gains the "option" to deliver other services to the business, including broadband services to that customer in the future at low incremental cost. These fundamental concepts are well recognized in the

industry and by fundamental financial textbooks. *See* Richard Clark, *Rethinking The Implications Of "Real Options" Theory For The U.S. Local Telephone Industry*, THE NEW INVESTMENT THEORY OF REAL OPTIONS AND ITS IMPLICATIONS FOR TELECOMMUNICATIONS ECONOMICS (1999); Richard Brealey and Stewart Meyers, PRINCIPLES OF CORPORATE FINANCE, 620-22 (2000).

131. For these reasons, any addition of options values to UNE cost estimates must reflect the balance of the options cost and the options benefit. In this regard, it is important to note that the incumbents, as a technical matter, miscalculate the options benefit. The full cost of forgoing an option to invest in the future should not be attributed to UNE provision alone; rather it should be attributed across all services that become available from the investment. Accordingly, if an incumbent invests in local facilities, any options costs associated with those sunk facilities should be allocated to all retail and wholesale customers, not only to wholesale customers, as the incumbents' calculations imply.

132. The bottom line is that the incumbents' discussion of options theory is quite incomplete. The incumbents fail to recognize that the values and costs of such options are likely reflected in the data used by existing cost of capital techniques, and thus reflected in the current cost of capital estimates. Furthermore, the incumbents fail to recognize that the value of such options may, in fact, be zero or even negative, requiring a *decrease*, not an increase, in the cost of capital estimates currently used by state commissions.

VERIFICATION PAGE

I declare under penalty of perjury that to the best of my knowledge the foregoing Declaration is true and correct.

/s/ Robert D. Willig
Robert D. Willig

Executed on: January 30, 2004